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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,365	07/13/2005	Yoshio Bando	2005-0516A	2995
513 7590 09/04/2007 WENDEROTH, LIND & PONACK, L.L.P. 2033 K STREET N. W. SUITE 800 WASHINGTON, DC 20006-1021			EXAMINER JAGAN, MIRELLYS	
			ART UNIT 2859	PAPER NUMBER
			MAIL DATE 09/04/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/530,365

Applicant(s)

BANDO ET AL.

Examiner

Mirellys Jagan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 13-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-12 and 17-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group II in the telephone conversation of 11/1/06 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement in the response filed 4/26/07, the election has been treated as an election without traverse (MPEP § 818.03(a)). Accordingly, the requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 7-12 and 17-²¹ rejected under 35 U.S.C. 103(a) as being unpatentable over the publication titled "Carbon nanothermometer containing gallium" by Gao et al [hereinafter Gao] in view of U.S. Patent 1,793,303 to Boyer.

Gao discloses a process for producing a temperature sensitive element comprising a carbon nanotube in which continuous and columnar gallium is included, wherein the length in the axial direction of the columnar gallium in the carbon nanotube can be changed with a change in the temperature of an environment, the process comprising:

mixing gallium oxide powder and carbon powder into a uniform state;

subjecting the mixed powder to heating treatment at 900°C-1400°C (1,360°C) under an inert gas flow for a time period, thereby vaporizing the mixture; and

causing the vapor to react at a temperature of 800°C;

wherein the weight ratio of the gallium oxide powder to the carbon powder is from 6:1 to 15:1 (7.8:1); the carbon powder is amorphous activated carbon; the inert gas is nitrogen gas; a vertical high frequency induction heating furnace is used to conduct the heating treatment; the length in the axial direction of the carbon nanotube is from 1 to 10 microns (up to 10 microns); and the diameter of the nanotube is from 100 to 200 nm (100-150 nm).

Gao does not disclose the use of indium to make the oxide powder, and is silent as to the particular time period, therefore not explicitly disclosing that the time period of the heating treatment is one hour or more.

However, Boyer discloses a temperature responsive device that uses gallium or indium as temperature sensing materials. Boyer discloses that indium is an equivalent of gallium for

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temperature sensing purposes since they both expand and contract as a function of temperature. (see page 1, lines 28-37, 54-56; and page 2, lines 115 and 116).

Referring to claim 7, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Gao by using indium instead of gallium when making the oxide for the temperature sensitive composition since Boyer teaches that indium and gallium are equivalent materials that will perform the same function of sensing temperature.

Referring to claims 12 and 24-27, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Gao and Boyer by conducting the heat treatment for an hour or more since this particular heating time period is considered to be an optimum amount of heating time that can be determined using routine experimentation based on the need to ensure proper heating treatment in order to produce the indium-based temperature sensitive element.

Response to Arguments

5. Applicant's arguments filed 4/26/07 have been fully considered but they are not persuasive. Applicant's arguments that it is not obvious to use indium instead of gallium in the thermometer of Gao because Gao states that gallium was chosen because it has one of the greatest liquid ranges of any metal and a low vapor pressure at high temperatures is not persuasive because this does not preclude the use of indium as a temperature sensing metal. Gallium was chosen as "one of" other metals, i.e., it is not the only one, but one of other metals capable of being used as a temperature sensing element. Therefore, indium is not excluded as a

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possible metal in the nanothermometer of Gao. Furthermore, the fact Applicant asserts that Gao had availability to the Boyer reference at the time the article was presented does not preclude on having ordinary skill in the art at the time the invention was made from realizing that indium and gallium are equivalent metals for use in thermometers, thus motivating the replacement of gallium with indium. Latly, Applicant's arguments that it is not obvious to combine the nanothermometer of Gao with the thermometer of Boyer are not persuasive since the thermometers are not being combined, what is being modified is the metal of Gao with another metal having equivalent characteristics, as taught by Boyer.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following reference discloses a nanothermometer:

JP 2006008417 to Bando et al

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 571-272-2247. The examiner can normally be reached on Monday-Friday from 12PM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJ
August 27, 2007


Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800